Insect community responses to prescribed fire & White-nose Syndrome in eastern deciduous forests

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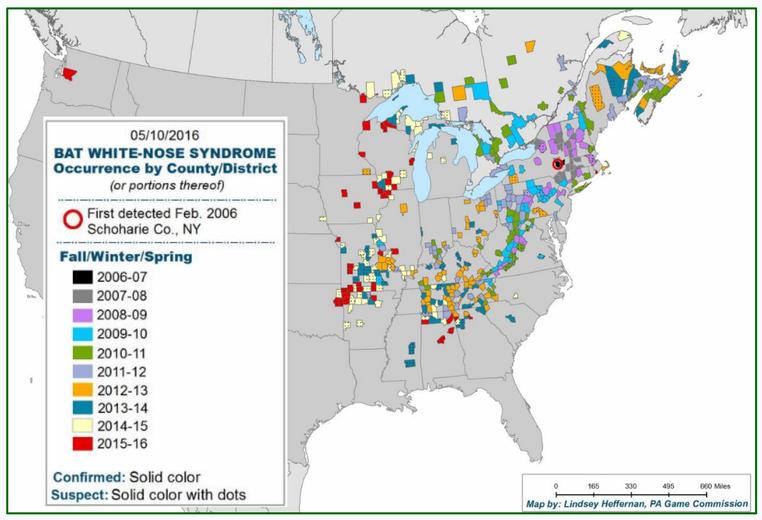
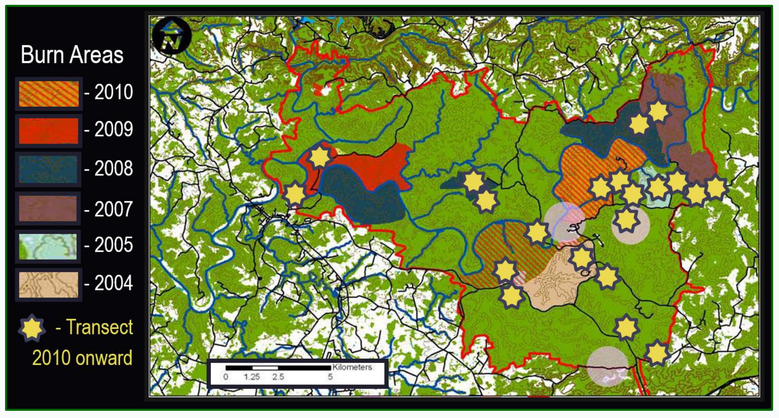
Introduction

- Insectivorous bats are important predators; studies suggest bats can exert top-down pressure on prey communities[1,2]
- Ecosystem services provided by bats in North America total in the billions of dollars[3]
- White-nose Syndrome (WNS) is an emergent disease responsible for the deaths of millions of bats in eastern North America
- WNS has destabilized bat community structure and relaxed niche partitioning[4]



Objectives & Study Design

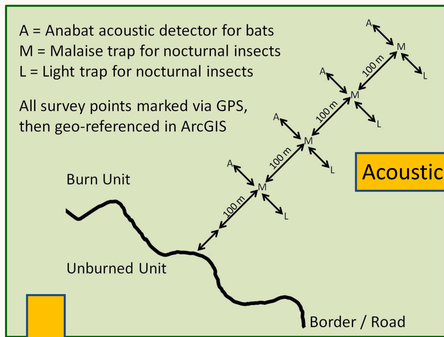
- We are elucidating the multi-trophic impacts of WNS in a fire-managed landscape
- Mammoth Cave National Park; WNS first detected in Jan 2013



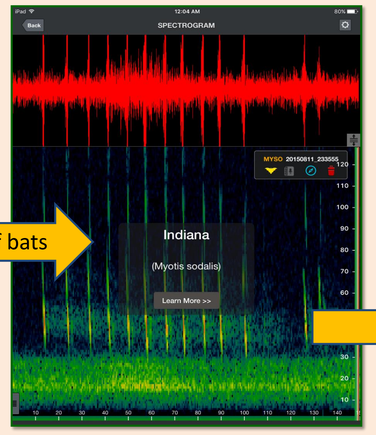
Methods & Results

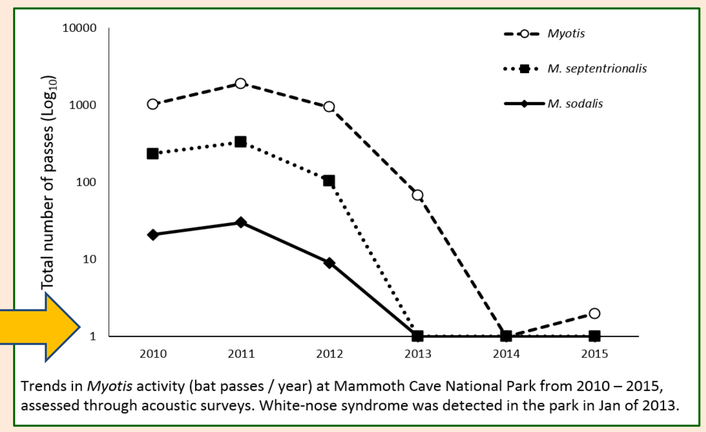
A = Anabat acoustic detector for bats
M = Malaise trap for nocturnal insects
L = Light trap for nocturnal insects

All survey points marked via GPS, then geo-referenced in ArcGIS



Acoustic ID of bats

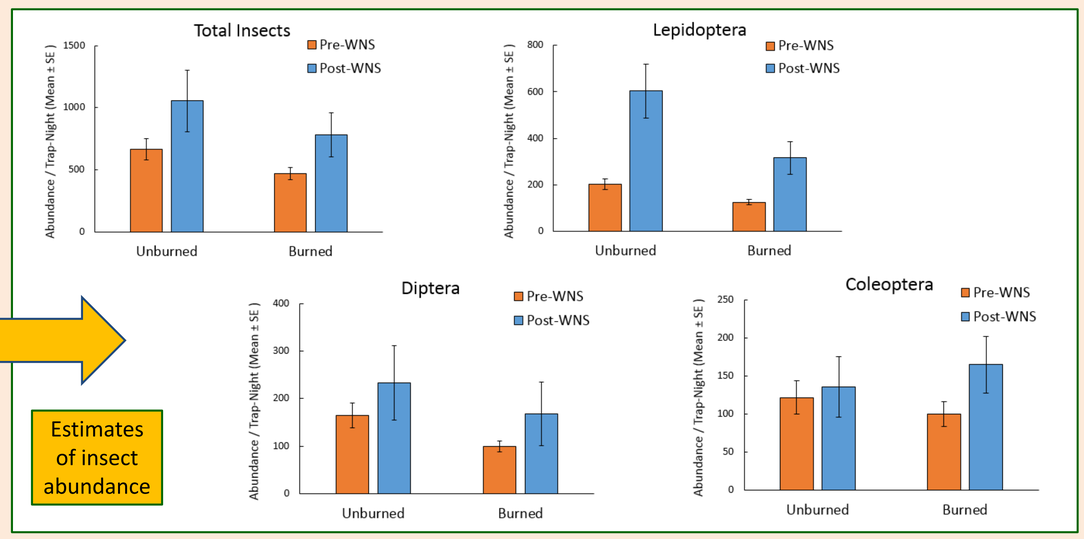




Trends in *Myotis* activity (bat passes / year) at Mammoth Cave National Park from 2010 – 2015, assessed through acoustic surveys. White-nose syndrome was detected in the park in Jan of 2013.

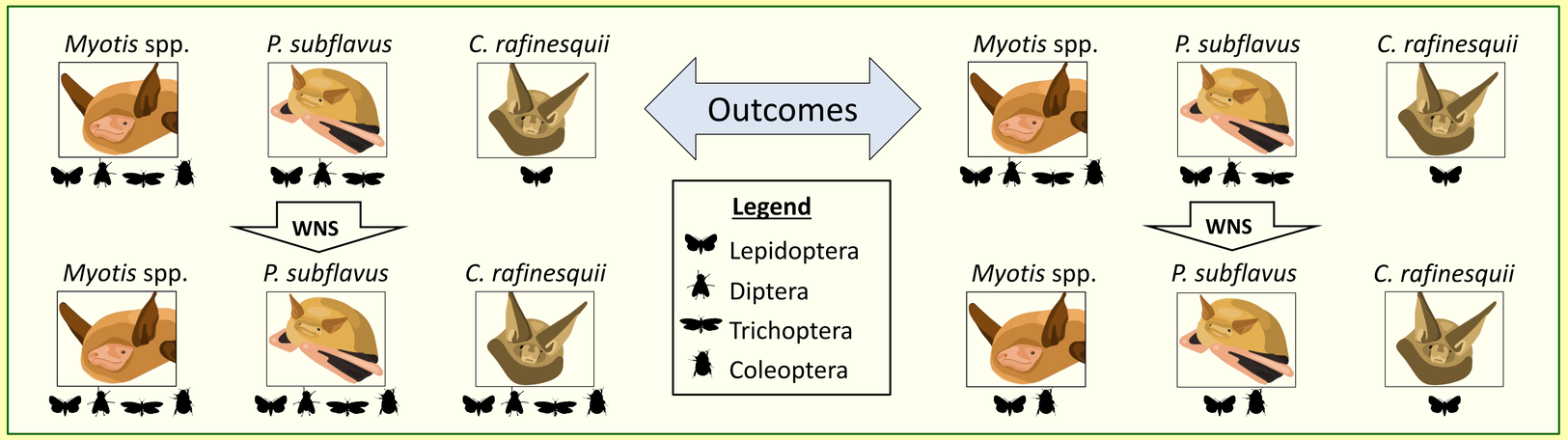
Light-trapping surveys

Estimates of insect abundance



Expected Outcomes & Implications

- Due to relaxed niche partitioning post-WNS, bats will adopt non-traditional foraging niches and thus be exposed to a new composition of available prey. The dramatic mortality associated with WNS may lead to reduced competition for prey resources among sympatric bat species.



- Diets may expand to include additional insect orders or narrow to rely more on preferred insect orders

Thanks!

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Collaborators

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Lit Cited

1. Kalka et al. 2008. Science 320: 71.
2. Williams-Guillen et al. 2008. Science 320: 70.
3. Boyles et al. 2011. Science 332: 41-42.
4. Jachowski et al. 2014. Diversity and Distributions 20: 1002–1015.